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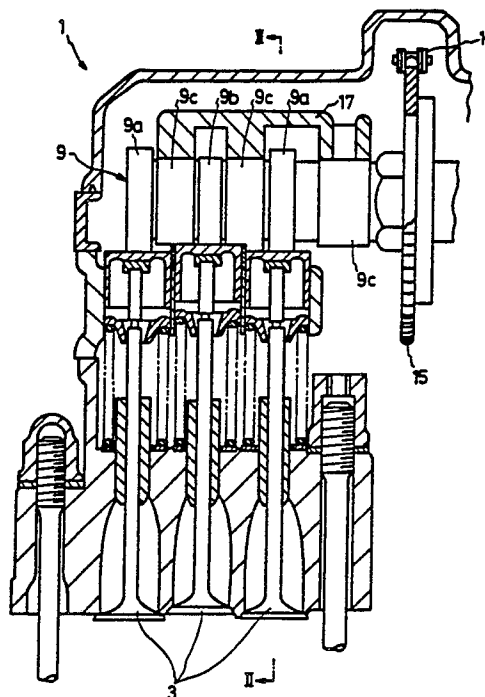
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(54) Valve actuating device for multi valve-type engine.

(57) In an engine having three or more inlet valves, said inlet valves (3) are disposed along the periphery of the cylinder. Said inlet valves having a long distance between the valve seat and the axis of the camshaft are arranged so that their cams (9a) have a large base circle diameter, valves having a long valve stem need not to be used and the length of valves are equalized.

FIG. 1



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Valve Actuating Device for Multi-Valve-Type Engine

Industrially Applicable Field:

This invention relates to a valve actuating device having at least three inlet valves operated by the same camshaft, part of the valves differing in the length between the axis of a camshaft and a valve seat from the other valves.

Prior Art:

An engine having three or more inlet valves disposed on an inside periphery of a cylinder is known from past (for example, Japanese Laid Open Patent Publication No. 59-165,810).

Problems to be Solved by the Invention:

In an engine of the above-mentioned type, however, the top surface of a combustion chamber is formed as flat as possible in order to increase a compression ratio. For this reason, the inlet valve positioned at the center differs from the other two valves disposed in both sides thereof not only in a crossed angle to the axis of an exhaust valve but also in a length between the valve seat and the axis of the camshaft.

As a result, it is unavoidable to prepare inlet valves whose valve stems have different lengths from each other. This causes a useless increase in inertial mass of the inlet valves and, in addition, it brings about a problem that the production cost is increased due to the increase of the kinds of parts.

Means for Solving the Problems:

The present invention has as its object the solving of the above problems, the prevention of useless increase of inertial mass of an inlet valve and the achievement of making three inlet valves in common to each other, and provides a device comprising at least three inlet valves disposed along the periphery of a cylinder and arranged to be actuated by a common camshaft, wherein reciprocally moving parts of said three inlet valves provided in said camshaft are constructed to be common to each other, and the diameter of the base circle of the cam which corresponds to the valve having a valve seat located at a position spaced apart from the axis of the camshaft is greater than those corresponding to the other valves.

Function:

Since, of the inlet valves disposed along the periphery of the cylinder, those having a long distance between the valve seat and the axis of the camshaft are arranged so that their cams have a large base circle diameter, valves having a long valve stem need not to be used and the lengths of valves can be equalized.

Embodiment:

The present invention will be explained below with reference to the embodiment illustrated in the drawings, in which the reference numeral 1 denotes a four-stroke engine, or so-called multi-valve-type engine, in which the total number of inlet valves and exhaust valves disposed on the top of a combustion chamber 2 is three or more. In the illustrated case, there are provided three inlet valves 3 and two exhaust valves 4. The combustion chamber 2 is defined by a cylinder 5, a cylinder head 6 and a piston 7. An electrode of a sparking plug 8 is disposed on the center of the top surface.

Designated as 9 is an inlet camshaft for opening and closing the inlet valves 3 through lifters 10 and as 11 is an exhaust camshaft for opening and closing the exhaust valves 4 through lifters 12. The two exhaust valves 4 are disposed in parallel with each other. The three inlet valves 3 are disposed along the inside periphery of the cylinder 5. The two inlet valves located on both sides correspond to outer cams 9a and 9a through lifters 10 and are oriented with the same tilt angle, whereas the other valve located at the center corresponds to a center cam 9b and is oriented at an angle similar to the axis of the cylinder.

The inlet camshaft 9 is driven by a crank shaft (not shown) through a timing chain 16 and a sprocket 15 provided on the shaft of the inlet camshaft 9. Designated as 9c is a journal portion for the inlet camshaft 9 and as 17 a bearing cap.

Thus, the distance between the axis of the inlet camshaft 9 and the valve seat of each valve, namely the necessary length of the valve is longer in the valves located on both sides than that located at the center. However, since the diameter of the base circle of the cam corresponding to each of the two valves located on both sides is made larger than that corresponding to the other valve, the lengths required for these valves can be made equal to each other.

Effect of the Invention:

As described in the foregoing, in the present invention, the diameter of the base circle of the cam of a valve, in which the length between the axis of the camshaft and the valve seat is large, is set to be large so that the required lengths of the valves can be made equal to each other, the valves and the lifters can be common to each other in spite of the irregularity in the length between the axis of the camshaft and the valve seats of the three poppet valves disposed on the inside periphery of the cylinder. Thus, there is obtained an effect that an increase in kinds of the parts can be avoided.

4. Brief Description of the Drawings:

The drawings illustrate an embodiment of the present invention, in which Fig. 1 is a cross-sectional view of a four-stroke engine; Fig. 2 is a cross section taken along the line II-II; and Fig. 3 is a cross section taken along the line III-III.

9 inlet camshaft, 11 exhaust camshaft,
9a,9a outer cams, 9b center cam

Claims

(1) A valve actuation device for a multi-valve-type engine, comprising at least three inlet valves disposed along the periphery of a cylinder and arranged to be actuated by a common camshaft, wherein reciprocally moving parts of said three inlet valves provided in said camshaft are constructed to be common to each other, and the diameter of the base circle of the cam which corresponds to the valve having a valve seat located at a position spaced apart from the axis of the camshaft is greater than those corresponding to the other valves.

(2) A valve actuation device for a multi-valve-type engine as set forth in claim 1, wherein the cams corresponding to the three inlet valves are arranged to have the same lift.

(3) A valve actuation device for a multi-valve-type engine as set forth in claim 1, wherein the reciprocally moving part of each inlet valve is a lifter.

FIG. 1

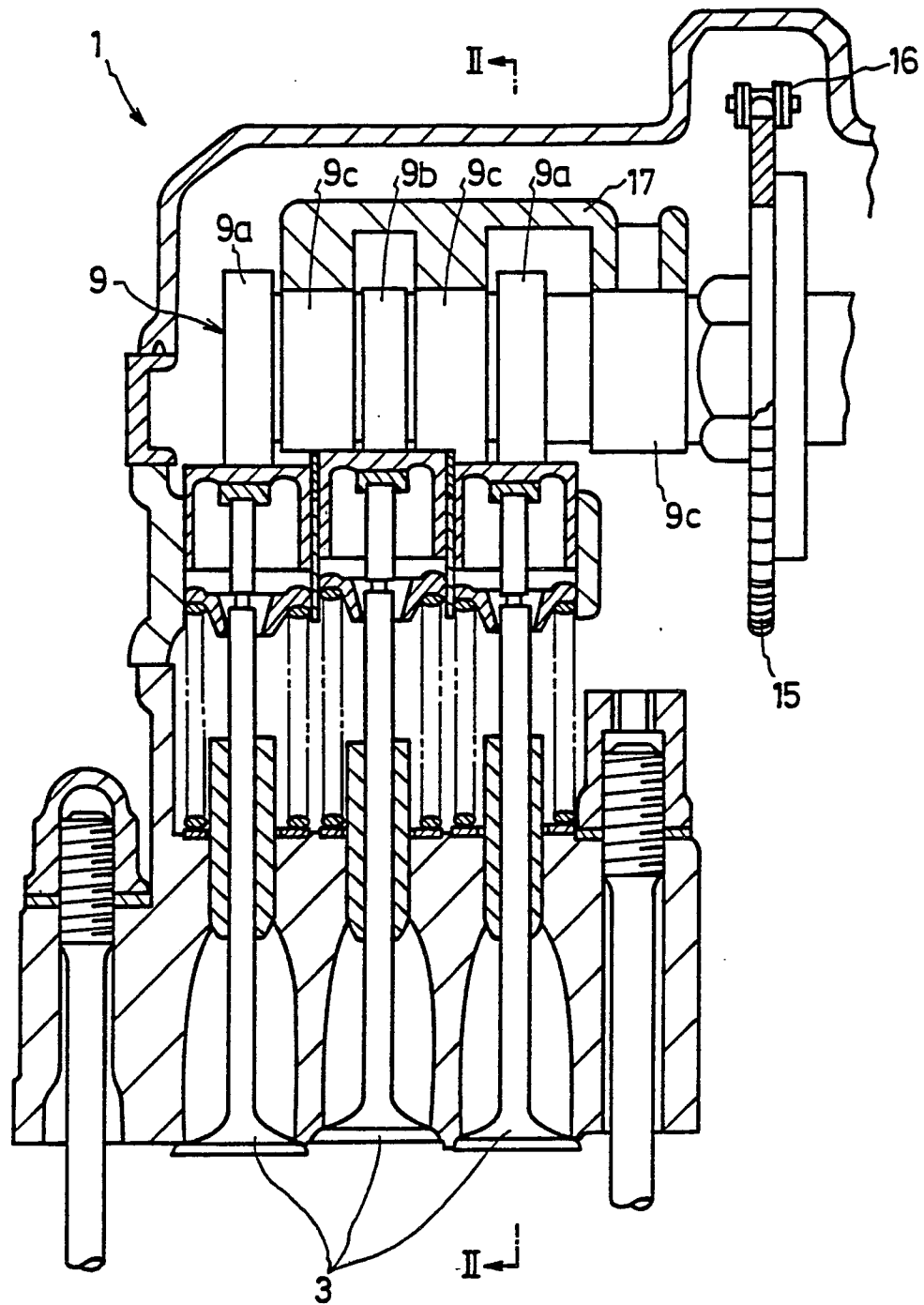


Fig. 2

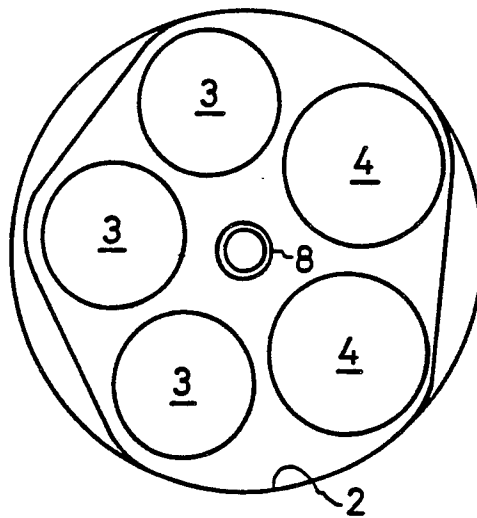
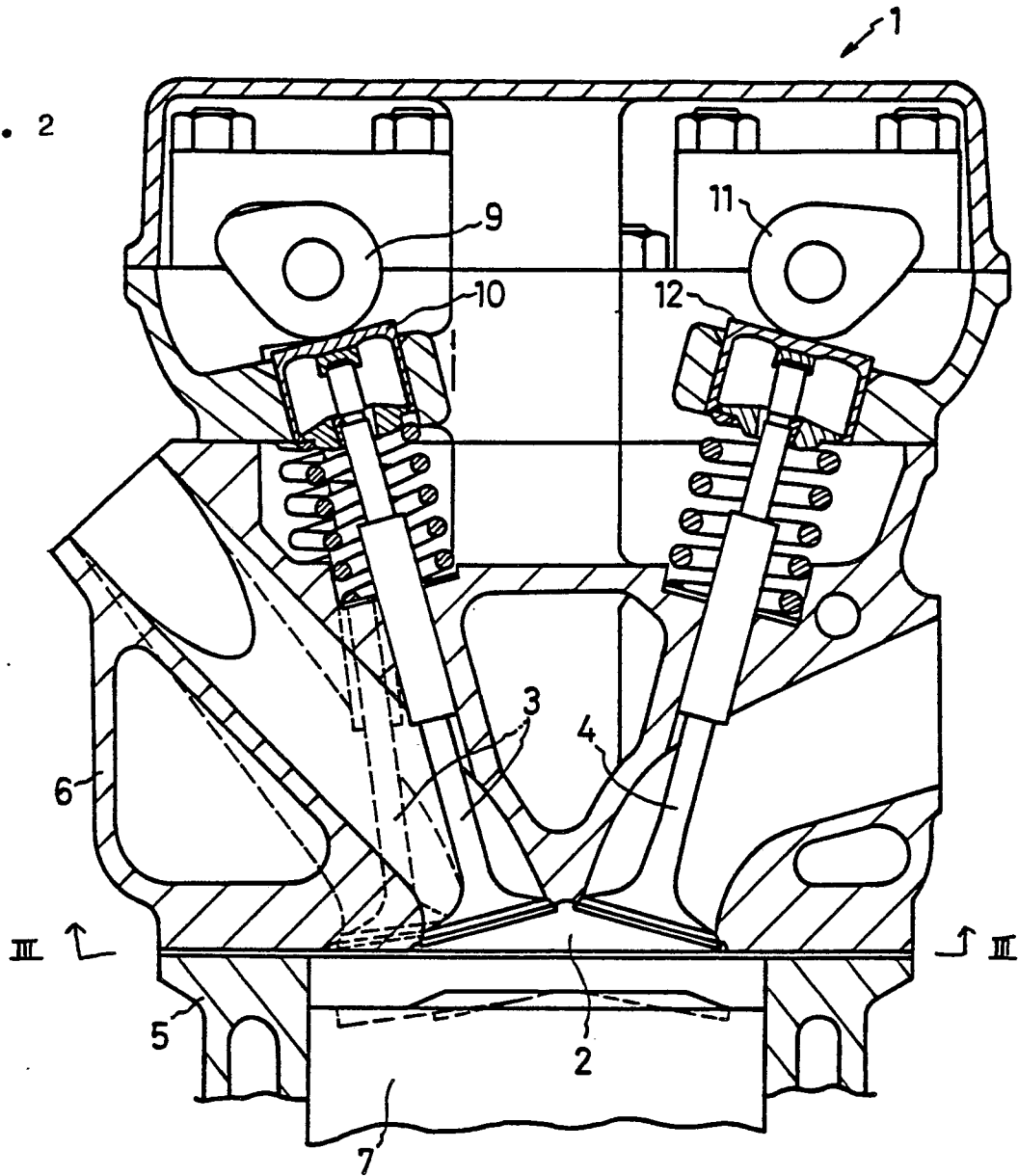


Fig. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-4 667 636 (K. OISHI) * Column 6, lines 35-64; figure 6 * ---	1	F 01 L 1/26
A	US-A-4 624 222 (M. YOSHIKAWA) * Column 4, lines 5-52; figures 1-5 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 01 L
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31-03-1989	Examiner LEFEBVRE L.J.F.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	